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"Stevinus introduced the operative use of decimals in 1585, and they were also used operatively by Bürgi in 1592, and Beyer in 1603. Both Stevinus and Beyer indicated the last integer and the first, second, &c., decimal figures by placing after or above them as exponents the numbers 0, 1, 2, &c. (a notation probably suggested by that which had long been used for sexagesimal fractions and survives in the marks for minutes and seconds), and even Bürgi, who thought it sufficient to place an 0 underneath the last integer, failed to attain 'the elegant simplicity' of the decimal point.

"Pitiscus, as shown in my previous letter, appears to have been the first to use the decimal point for separating the integers from the decimals in expressions of quantity. But he does not appear to have used it operatively; the evidence indeed is rather the other way. In the tables to both the second and the third editions of his 'Trigonometria' (1608, 1612) he gives, for instance, the sine of $30^\circ 20'$ to radius 100,000 as 50502.98; but in the example (at the beginning of book 3 in both these editions) of ascertaining the length of the sine of this angle for a radius of 24 ft., he takes the sine as 5050298 to radius 10,000,000, and states the result as $12 \frac{1207152}{10000000}$.

"The decimal point was not used in the original Latin edition of Napier's 'Descriptio' of 1614, but it was used in the English edition of 1616, as described in my previous letter. In neither edition, however, is there an example of its operative use. But in Napier's 'Rabdologiae,' Edinburgh, 1617, bk. 1. ch. 4, the description of the use of the numbered rods, commonly called Napier's Bones, in compound division is followed by an 'Admonitio pro Decimali Arithmetica,' in which Napier refers to Stevinus's Decimal Arithmetic, and says—to quote the translation in Mr. Macdonald's book mentioned below—

"'Since there is the same facility in working with these fractions as with the whole numbers, you will be able, after completing the ordinary division, and adding a period or comma, as in the margin, to add to the dividend or to the remainder one cypher to obtain tenths, two for hundredths, three for thousandths, or more afterwards as required; and with these you will be able to proceed with the working as above' . . .

"In the margin is the example of dividing 1180 by 432 (sic), with the result stated as 1993,273 which, as he explains, is equivalent to $1993 \frac{273}{1000}$ or $1993,2' 7'' 3'''$. This is probably the earliest printed instance of the operative use of decimals with the decimal point, or its equivalent, the decimal comma.

"In Napier's 'Constructio,' with Notes by Briggs, which was printed in 1619 after Napier's death, decimals are both described and used operatively with the decimal point, strictly so called. Mr. W. R. Macdonald, in his translation with notes (1889) of the 'Constructio,' makes special reference to this feature on pp. 88, 89, setting out the above quoted passage from 'Rabdologiae' (1617), and observing that it is interesting as Napier's first published reference to decimal arithmetic, though sections 4, 5, and 47 of the 'Constructio' which deal with it 'must have been written long before that date.'"]

UNDERGRADUATE MATHEMATICS CLUBS.

All reports of club activities should be sent to E. L. Dodd, 3012 West Ave., Austin, Texas

CLUB ACTIVITIES.

THE MATHEMATICS CLUB OF ALBION COLLEGE, Albion, Michigan.

[1918, 354; 1919, 409.]

Officers, elected each semester in 1919-20 and 1920-21, were as follows: Presidents, Esther Pearl '20, Joyce Hadaway '20, Elizabeth Gordon '21, Gertrude Pratt '21; vice-presidents, Joyce Hadaway '20, Harland Hatch '20, Gertrude Pratt '21, Mary Hutchins '21; secretary-treasurers, Almira Priest '20, Almira Priest '20, Mary Hutchins '21, Harold Black '23; third member of program committee, Elizabeth Gordon '21, Clark Dean '21, Christine Niemann '21, Marie de Vries '21.

The programs, which are listed below, usually included a general consideration of some topic at roll call, followed by one or more papers or talks.

October 28, 1919: "Our great inheritance—Mathematics" by Esther Pearl '20.

November 4: "Graphical algebra" by Carl Anderson '21; "Mathematical lists" by Elizabeth Gordon '21.

December 2: The work of great mathematicians; "The Flatlanders" by Gertrude Pratt '21.

December 9: Myths of constellations; talk by Mary Hutchins '21.

December 16: Applications of mathematics; "Geometrical representations of intermediate forms" by Donald Herrick '21.

January 14, 1920: Women in mathematics; "Hyperbolic functions" by Esther Pearl '20.

January 20: Letters from alumnae read by Almira Priest '20.

January 27: Mathematical publications; "Mathematical fallacies" by Carl Anderson '21; "History of mathematics in the United States during the nineteenth century" by Christine Niemann '21.

March 2: Historical theorems; "The Leibnitz-Newton controversy" by Charlotte LaMastus '21 and Gertrude Pratt '21.

March 16: Present day mathematicians; "Graphs in ninth-grade algebra" by Elizabeth Gordon '21; "Eulerian integrals and Gamma functions" by Clark Dean '21.

April 13: Difficult solutions in algebra; "The junior high school" by Joyce Hadaway '20; "Historical development of the number system" by Clark Dean '21.

April 27: Trigonometric functions and geometrical constructions; "Elementary algebra and geometry" by Professor Head.

May 11: "Harmonics" by Joyce Hadaway '20; "Anharmonics" by Miss Hubert.

November 2: Facts about mathematicians; "A 'flu' dream in mathematics" by Gertrude Pratt '21; "The project method in teaching" by Mary Hutchins '21.

November 16: Mathematical jokes; "Applications of the forms of zero and unity" by Marie Plumb '22; "The circles of Appollonius" by Christine Niemann '21.

November 30: Constellations and myths about them; "Calculation by geometry of astronomical distances" by Elizabeth Gordon '21; "Mathematics, the farmer, and the weather" by Charlotte LaMastus '21.

December 21: Trigonometric functions and their development; "The math quest" by Harold Black '23; "Hyperbolic functions" by Gertrude Pratt '21.

January 18, 1921: Mathematical current events; "The Courtis intelligence test" by Rex Miller '21; "Problems in junior high school mathematics" by Lona Stockmeyer '21.

January 25: "Minimum requirements for high school mathematics" by Marie deVries '21; "The monkey and cocoanut problem" by Professor E. R. Sleight.

(Report by Mr. Black.)

MU THETA EPSILON, ALPHA CHAPTER, University of California, Berkeley, Cal.

A mathematics club was organized at the University of California under the name of Mu Theta Epsilon in April, 1920, with three aims: (a) The stimulation of interest in mathematics and the inducement of better work therein; (b) The discussion of mathematical topics; (c) The promotion of congeniality among students and closer coöperation between students and professors.

Membership is limited to women students, and includes juniors, seniors, and graduates. Twenty-two active members have participated during 1920-21, and regular monthly meetings have been held.

The officers for the current year are: President, Mamie Cohen '20; vice-president, Evelyn Aylesworth '20; secretary, Helene Clark, '21; treasurer, Nellie Bartlett '20; active faculty member, Dr. Pauline Sperry.

The following programs have been given:

September 1, 1920: "A special quartic curve" by Elsie McFarland '17; "Devices in mathematics used by peasants of Russia" by Professor B. A. Bernstein.

October 6: "Mathematics clubs in high schools" by Constance Kendall '20; "Geometry of the circle or compass" by Gladys-Mary Campbell '18.

November 3: "Mathematical theory of the satine arrangement" by Mildred Hurd '21; "The fourth dimension" by Ruth Brant '21.

December 1: "A discussion of hyperspace" by Nina Alderton '14; "Mathematical fallacies" by Nellie Bartlett '20.

February 1, 1921: "Concrete multipliers" by Lora Lind '21.

March 2: "Lambert's solution of the equation by infinite series" by Mamie Cohen '20; "D. M. D. Method of computing areas" by Thelma Hansen '21.

The Beta Chapter of Mu Theta Epsilon was established at the University of Southern California in Los Angeles in December, 1920. Plans for the organization of chapters at Leland Stanford University at Palo Alto, and Pomona College at Claremont, are under way. It is hoped to make Mu Theta Epsilon a national mathematics honor society in the near future.

(Report by Miss Clarke.)

THE JUNIOR MATHEMATICAL CLUB OF THE UNIVERSITY OF CHICAGO, Chicago, Ill.
[1918, 34, 448.]

In the autumn of 1918, owing to the great confusion in connection with S. A. T. C., the club was not organized, but in the autumn of 1919 its work was again resumed.

The officers for 1919-20 were as follows: President, Ernest Zeisler Gr.; secretary and treasurer, Lila Nelson Gr.; program committee, Mrs. Mayme I. Logsdon Gr., Gladys Freeman Gr., and J. W. Lasley Gr. The number of members for the year was forty-two, and the average attendance, thirty-one.

The programs for 1919-20 were as follows:

October 22, 1919: "History and purposes of the Club" by Professor H. E. Slaughter.

November 5: "Methods of counting" by Mrs. Mayme I. Logsdon Gr.

November 26: "Isosceles triangles" by Isaac Schour '21; "Magic squares" by Leah Libman '21; "Game of kim" by Lila Nelson Gr.

December 3: "The isosceles triangle" by C. C. MacDuffee Gr.; "Zeno's paradoxes of motion" by V. D. Gokhale Gr.

December 17: "Non-euclidean geometry" by Roy Haskell Gr.

January 14, 1920: "Arithmetical properties of numbers" by Gladys Freeman Gr.

February 11: "Some simple examples of covariants and invariants" by J. W. Lasley Gr.

February 25: "Concerning two particular matrices" by Professor E. H. Moore.

March 10: "Hyperbolic functions" by E. T. Browne Gr.

April 7: "Solution of quadratics" by J. C. Kamplain Gr.; "Intèrpolations" by S. J. Jacobson Gr.

April 21: "The theory of the complex number system" by C. C. MacDuffee Gr.

May 5: "The fundamental theorem of algebra" by Gladys Freeman Gr.

May 19: "The philosophical conception of the universe" by Dr. Edward Lasker, efficiency engineer, Chicago, Ill.

June 9: A beach party was given for the Graduate Mathematical Club and the Faculty of the department.

The officers for 1920-21 were as follows: President, E. T. Browne Gr.; vice-president, E. B. Miller Gr.; secretary and treasurer, Agnes Jones Gr.; program committee, Claribel Kendall Gr., E. T. Browne Gr., Myrtle Collier Gr. The number of members for the year was twenty-five, and the average attendance, twenty-one.

The programs for 1920-21 were as follows:

November 10, 1920: "History, purposes and aim of the Club" by Professor Slaught.

November 24: "Hyperbolic functions" by E. B. Miller Gr.

December 8: "The history of the parallel postulate" by Claribel Kendall Gr.

January 5, 1921: "Exterior ballistics" by Major H. E. Miner, U. S. Army.

January 19: "Linear algebras" by C. C. MacDuffee Gr.

February 2: "Zermelo's theorem: 'Every class can be well ordered'" by V. D. Gokhale Gr.

February 16: "Two famous geometry problems of antiquity" by Roy Haskell '21.
(Report by Miss Jones.)

PROBLEMS AND SOLUTIONS.

EDITED BY B. F. FINKEL, OTTO DUNKEL, AND H. P. MANNING.

Send all communications about Problems and Solutions to **B. F. FINKEL**, Springfield, Mo.

PROBLEMS FOR SOLUTION.

[N.B. Problems containing results believed to be new, or extensions of old results are especially sought. The editorial work would be greatly facilitated if, on sending in problems, proposers would also enclose any solutions or information that will assist the editors in checking the statements. In general, problems in well-known text-books, or results found in readily accessible